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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

In re:
INVENTOR: Robert Martinson et) EXAMINER: Michael A. Band
al.)
)
SERIAL NO.: 10/823,355) ART UNIT: 1753
)
FILING DATE: April 12, 2004) DATE: December 11, 2007
FOR: **Moving Interleaved Sputter Chamber Shields**

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

BRIEF FOR APPELLANTS

This is an appeal from the final rejection by the Examiner mailed July 25, 2007, rejecting claims 1-11 and 13-20. A notice of appeal and the appeal fee were timely filed on October 11, 2007.

Payment for \$510.00 for the appeal brief fee (large entity) is enclosed. Please charge any over or under payment to the assignee's Deposit Account No. 04-0566.

REAL PARTY IN INTEREST

The real party in interest is the assignee of all rights in this application, Novellus Systems, Inc., a corporation of the State of California, having a place of business at 4000 North First Street, San Jose, California 95134.

RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences known to appellants, appellants' legal representatives or assignee, which will directly affect or be affected by, or have a bearing on the Board's decision on this appeal.

STATUS OF CLAIMS

The subject application was filed on April 12, 2004 with claims 1-20. An amendment was filed on July 2, 2007, responsive to the office action mailed May 2, 2007, amending claims 1, 11, 14 and canceling claim 12. In an office action mailed July 25, 2007, a final rejection was made of all of the claims in the application, to wit, claims 1-11 and 13-20. Appellants are appealing the rejection of these claims.

STATUS OF AMENDMENTS

All the amendments made during prosecution of the application have been entered and are presently in the application. The rejected claims 1-11 and 13-20 as they presently stand are set forth in the Appendix. A summary of the rejection of the claims may be found in the Office Action mailed July 25, 2007.

SUMMARY OF CLAIMED SUBJECT MATTER

I. Independent claim 1

Appellants' invention as recited in independent claim 1 is directed to a shielding system for a physical vapor deposition chamber 20 (Figs. 1 and 2). Specification, paragraph 0044, lines 1-2. The chamber 20 (Figs. 1 and 2) has a pedestal 30 (Figs. 1-

14, and 17-20) movable between a lowered loading and unloading position (Figs. 2, 5, 7, 9, 11, 13, 15, 17 and 19) and a raised deposition processing position (Figs. 3, 4, 6, 8, 10, 12, 14, 16, 18 and 20) (specification, paragraph 0044, lines 8-11) and is surrounded by chamber interior lower wall 36 (Figs 2, 3 and 5-20), side walls 34 (Figs. 1-20) and upper wall 32 (Figs. 2, 3, 5-8, and 11-20) (specification, paragraph 0044, lines 6-8). The chamber 20 (Figs. 1 and 2) further includes a sputter target 26 (Figs. 2-20) above the pedestal 30 (Figs. 1-14, and 17-20). Specification, paragraph 0044, lines 10-11.

The shielding system comprises a pedestal shield 50, 52, 54 (Figs. 1-4), 50a, 52a, 54a, 54b (Figs. 5 and 6), 50c, 52c (Figs. 7 and 8), 50d, 52d (Figs. 9 and 10), 50e, 52e (Figs. 11 and 12), 50f, 52f (Figs. 13 and 14), 50g, 52g (Figs. 15-18) and 50h, 52h (Figs. 19 and 20) attachable to the pedestal 30 (Figs. 1-14, and 17-20) and movable therewith between the lowered and raised positions. Specification, paragraph 0046, lines 1-12. The pedestal shield 50, 52, 54 (Figs. 1-4), 50a, 52a, 54a, 54b (Figs. 5 and 6), 50c, 52c (Figs. 7 and 8), 50d, 52d (Figs. 9 and 10), 50e, 52e (Figs. 11 and 12), 50f, 52f (Figs. 13 and 14), 50g, 52g (Figs. 15-18) and 50h, 52h (Figs. 19 and 20) surrounds and extends outward from the pedestal 30 (Figs. 1-14, and 17-20) toward the chamber side walls 34 (Figs. 1-20) or lower walls 36 (Figs 2, 3 and 5-20). Specification, paragraph 0046, lines 1-12.

The system also comprises a sidewall shield 40, 42, 44, 46 (Figs. 1-4), 40a, 42a, 42b (Figs. 5 and 6), 40c, 42c (Figs. 7 and 8), 40d, 42d (Figs. 9 and 10), 40e, 42e (Figs. 11 and 12), 40f, 42f (Figs. 13 and 14), 40g, 42g (Figs. 15-18) and 40h, 42h (Figs. 19 and 20) adapted to extend substantially around and within the chamber side walls 34 (Figs. 1-20), and downward from an upper portion thereof. Specification, paragraph

0045, lines 1-11. The sidewall shield has a lower end 42 (Figs. 1-4), 42a, (Figs. 5 and 6), 42c (Figs. 7 and 8), 42d (Figs. 9 and 10), 42e (Figs. 11 and 12), 42f (Figs. 13 and 14), 42g (Figs. 15-18) and 42h (Figs. 19 and 20) extending inward and disposed adjacent the pedestal shield upper portion 50 (Figs. 1-4), 50a, (Figs. 5 and 6), 50c (Figs. 7 and 8), 50d (Figs. 9 and 10), 50e (Figs. 11 and 12), 50f (Figs. 13 and 14), 50g (Figs. 15-18) and 50h (Figs. 19 and 20) when the pedestal 30 (Figs. 1-14, and 17-20) is in the raised position. Specification, paragraph 0047, lines 1-18.

The sidewall shield lower end 42 (Figs. 1-4), 42a, (Figs. 5 and 6), 42c (Figs. 7 and 8), 42d (Figs. 9 and 10), 42e (Figs. 11 and 12), 42f (Figs. 13 and 14), 42g (Figs. 15-18) and 42h (Figs. 19 and 20) is above the pedestal 30 (Figs. 1-14, and 17-20), when the pedestal is in the lowered position, a distance sufficient to permit a wafer to be horizontally loaded onto the pedestal. Specification, paragraph 0046, lines 7-12 and paragraph 0049, lines 20-22.

The pedestal shield 50, 52, 54 (Figs. 1-4), 50a, 52a, 54a, 54b (Figs. 5 and 6), 50c, 52c (Figs. 7 and 8), 50d, 52d (Figs. 9 and 10), 50e, 52e (Figs. 11 and 12), 50f, 52f (Figs. 13 and 14), 50g, 52g (Figs. 15-18) and 50h, 52h (Figs. 19 and 20) and sidewall shield 40, 42, 44, 46 (Figs. 1-4), 40a, 42a, 42b (Figs. 5 and 6), 40c, 42c (Figs. 7 and 8), 40d, 42d (Figs. 9 and 10), 40e, 42e (Figs. 11 and 12), 40f, 42f (Figs. 13 and 14), 40g, 42g (Figs. 15-18) and 40h, 42h (Figs. 19 and 20) cooperate, when the pedestal 30 (Figs. 1-14, and 17-20) is in the raised position, to prevent line-of-sight deposition transmission from the sputter target 26 (Figs. 2-20) to the side walls 34 (Figs. 1-20) and lower wall 36 (Figs. 2, 3 and 5-20) of the deposition chamber 20 (Figs. 1 and 2). Specification, paragraph 0047, lines 8-18.

II. Independent claim 14

The claimed invention as recited in independent claim 14 is directed to a shielding system for a physical vapor deposition chamber 20 (Figs. 1 and 2). Specification, paragraph 0044, lines 1-2. The chamber 20 (Figs. 1 and 2) has a pedestal 30 (Figs. 1-14 and 17-20) movable between a lowered loading and unloading position (Figs. 2, 5, 7, 9, 11, 13, 15, 17 and 19) and a raised deposition processing position (Figs. 3, 4, 6, 8, 10, 12, 14, 16, 18 and 20) (specification, paragraph 0044, lines 8-11) and is surrounded by chamber interior lower wall 36 (Figs 2, 3 and 5-20), side walls 34 (Figs. 1-20) and upper wall 32 (Figs. 2, 3, 5-8, and 11-20) (specification, paragraph 0044, lines 6-8). The chamber 20 (Figs. 1 and 2) further includes a sputter target 26 (Figs. 2-20) above the pedestal 30 (Figs. 1-14 and 17-20). Specification, paragraph 0044, lines 10-11.

The shielding system comprises a pedestal shield 50, 52, 54 (Figs. 1-4), 50a, 52a, 54a, 54b (Figs. 5 and 6), 50c, 52c (Figs. 7 and 8), 50d, 52d (Figs. 9 and 10), 50e, 52e (Figs. 11 and 12), 50f, 52f (Figs. 13 and 14), 50g, 52g (Figs. 15-18) and 50h, 52h (Figs. 19 and 20) securable to the pedestal 30 (Figs. 1-14 and 17-20) and movable therewith. Specification, paragraph 0046, lines 1-12. The pedestal shield has an upper portion 50 (Figs. 1-4), 50a, (Figs. 5 and 6), 50c (Figs. 7 and 8), 50d (Figs. 9 and 10), 50e (Figs. 11 and 12), 50f (Figs. 13 and 14), 50g (Figs. 15-18) and 50h (Figs. 19 and 20) surrounding the pedestal 30 (Figs. 1-14 and 17-20) and a lower portion 54 (Figs. 1-4), 52d (Figs. 9 and 10), 52e (Figs. 11 and 12), 52g (Figs. 15-18) and 52h (Figs. 19 and 20) extending downward therefrom around the pedestal 30 (Figs. 1-14 and 17-20) toward the chamber lower wall 36 (Figs 2, 3 and 5-20). Specification, paragraph 0046, lines 1-12.

The system also comprises a sidewall shield 40, 42, 44, 46 (Figs. 1-4), 40a, 42a, 42b (Figs. 5 and 6), 40c, 42c (Figs. 7 and 8), 40d, 42d (Figs. 9 and 10), 40e, 42e (Figs. 11 and 12), 40f, 42f (Figs. 13 and 14), 40g, 42g (Figs. 15-18) and 40h, 42h (Figs. 19 and 20) adapted to extend downward from an upper portion of the chamber sidewalls 34 (Figs. 1-20) (specification, paragraph 0045, lines 1-11) and having a lower end 42 (Figs. 1-4), 42a, (Figs. 5 and 6), 42c (Figs. 7 and 8), 42d (Figs. 9 and 10), 42e (Figs. 11 and 12), 42f (Figs. 13 and 14), 42g (Figs. 15-18) and 42h (Figs. 19 and 20) disposed below the pedestal shield upper portion 50 (Figs. 1-4), 50a, (Figs. 5 and 6), 50c (Figs. 7 and 8), 50d (Figs. 9 and 10), 50e (Figs. 11 and 12), 50f (Figs. 13 and 14), 50g (Figs. 15-18) and 50h (Figs. 19 and 20) when the pedestal 30 (Figs. 1-14 and 17-20) is in the raised position (specification, paragraph 0047, lines 1-18).

The sidewall shield lower end 42 (Figs. 1-4), 42a, (Figs. 5 and 6), 42c (Figs. 7 and 8), 42d (Figs. 9 and 10), 42e (Figs. 11 and 12), 42f (Figs. 13 and 14), 42g (Figs. 15-18) and 42h (Figs. 19 and 20) is above the pedestal 30 (Figs. 1-14, and 17-20), when the pedestal is in the lowered position, a distance sufficient to permit a wafer to be horizontally loaded onto the pedestal. Specification, paragraph 0046, lines 7-12 and paragraph 0049, lines 20-22.

The pedestal shield 50, 52, 54 (Figs. 1-4), 50a, 52a, 54a, 54b (Figs. 5 and 6), 50c, 52c (Figs. 7 and 8), 50d, 52d (Figs. 9 and 10), 50e, 52e (Figs. 11 and 12), 50f, 52f (Figs. 13 and 14), 50g, 52g (Figs. 15-18) and 50h, 52h (Figs. 19 and 20) and sidewall shield 40, 42, 44, 46 (Figs. 1-4), 40a, 42a, 42b (Figs. 5 and 6), 40c, 42c (Figs. 7 and 8), 40d, 42d (Figs. 9 and 10), 40e, 42e (Figs. 11 and 12), 40f, 42f (Figs. 13 and 14), 40g, 42g (Figs. 15-18) and 40h, 42h (Figs. 19 and 20) cooperate, when the pedestal 30 (Figs. 1-14 and 17-20) is in the raised position, to prevent line-of-sight deposition transmission

from the sputter target 26 (Figs. 2-20) to the side walls 34 (Figs. 1-20) and lower wall 36 (Figs 2, 3 and 5-20) of the deposition chamber 20 (Figs. 1 and 2), and line-of-sight or gas-scattered transmission of deposition from sides of the pedestal shield 50, 52, 54 (Figs. 1-4), 50a, 52a, 54a, 54b (Figs. 5 and 6), 50c, 52c (Figs. 7 and 8), 50d, 52d (Figs. 9 and 10), 50e, 52e (Figs. 11 and 12), 50f, 52f (Figs. 13 and 14), 50g, 52g (Figs. 15-18) and 50h, 52h (Figs. 19 and 20) facing toward the chamber upper wall 32 (Figs. 2, 3, 5-8, and 11-20) to the side walls 34 (Figs. 1-20) and lower wall 36 (Figs 2, 3 and 5-20) of the deposition chamber 20 (Figs. 1 and 2). Specification, paragraph 0047, lines 1-18.

III. Independent claim 20

As described in independent claim 20, the present invention is directed to a method of shielding a physical vapor deposition chamber 20 (Figs. 1 and 2). Specification, paragraph 0044, lines 1-2. The chamber 20 (Figs. 1 and 2) has a pedestal 30 (Figs. 1-14 and 17-20) movable between a lowered loading and unloading position (Figs. 2, 5, 7, 9, 11, 13, 15, 17 and 19) and a raised deposition processing position (Figs. 3, 4, 6, 8, 10, 12, 14, 16, 18 and 20 (specification, paragraph 0044, lines 8-11)) and is surrounded by chamber interior lower wall 36 (Figs 2, 3 and 5-20), side walls 34 (Figs. 1-20) and upper wall 32 (Figs. 2, 3, 5-8, and 11-20) (specification, paragraph 0044, lines 6-8). The chamber 20 (Figs. 1 and 2) further includes a sputter target 26 (Figs. 2-20) above the pedestal 30 (Figs. 1-14 and 17-20). Specification, paragraph 0044, lines 10-11.

The method comprises initially providing a shielding system having a pedestal shield 50, 52, 54 (Figs. 1-4), 50a, 52a, 54a, 54b (Figs. 5 and 6), 50c, 52c (Figs. 7 and 8), 50d, 52d (Figs. 9 and 10), 50e, 52e (Figs. 11 and 12), 50f, 52f (Figs. 13 and 14), 50g, 52g (Figs. 15-18) and 50h, 52h (Figs. 19 and 20) secured to the pedestal 30 (Figs. 1-14

and 17-20) and movable therewith between the lowered and raised positions. Specification, paragraph 0046, lines 1-12. The pedestal shield 50, 52, 54 (Figs. 1-4), 50a, 52a, 54a, 54b (Figs. 5 and 6), 50c, 52c (Figs. 7 and 8), 50d, 52d (Figs. 9 and 10), 50e, 52e (Figs. 11 and 12), 50f, 52f (Figs. 13 and 14), 50g, 52g (Figs. 15-18) and 50h, 52h (Figs. 19 and 20) surrounds and extends outward from the pedestal 30 (Figs. 1-14 and 17-20) toward the chamber side walls 34 (Figs. 1-20) or lower wall 36 (Figs. 2, 3 and 5-20). Specification, paragraph 0046, lines 1-12.

There is also provided a sidewall shield 40, 42, 44, 46 (Figs. 1-4), 40a, 42a, 42b (Figs. 5 and 6), 40c, 42c (Figs. 7 and 8), 40d, 42d (Figs. 9 and 10), 40e, 42e (Figs. 11 and 12), 40f, 42f (Figs. 13 and 14), 40g, 42g (Figs. 15-18) and 40h, 42h (Figs. 19 and 20) extending substantially around and within the chamber 20 (Figs. 1 and 2) sidewalls, and downward from an upper portion thereof. Specification, paragraph 0045, lines 1-11. The sidewall shield has a lower end 42 (Figs. 1-4), 42a, (Figs. 5 and 6), 42c (Figs. 7 and 8), 42d (Figs. 9 and 10), 42e (Figs. 11 and 12), 42f (Figs. 13 and 14), 42g (Figs. 15-18) and 42h (Figs. 19 and 20) extending inward and disposed adjacent the pedestal shield upper portion 50 (Figs. 1-4), 50a, (Figs. 5 and 6), 50c (Figs. 7 and 8), 50d (Figs. 9 and 10), 50e (Figs. 11 and 12), 50f (Figs. 13 and 14), 50g (Figs. 15-18) and 50h (Figs. 19 and 20) when the pedestal 30 (Figs. 1-14 and 17-20) is in the raised position. Specification, paragraph 0047, lines 1-18.

The method then includes moving the pedestal 30 (Figs. 1-14 and 17-20) to the lowered position in the chamber 20 (Figs. 1 and 2) such that the sidewall shield lower end 42 (Figs. 1-4), 42a, (Figs. 5 and 6), 42c (Figs. 7 and 8), 42d (Figs. 9 and 10), 42e (Figs. 11 and 12), 42f (Figs. 13 and 14), 42g (Figs. 15-18) and 42h (Figs. 19 and 20) is above the pedestal 30 (Figs. 1-14 and 17-20) a distance sufficient to permit a wafer to

be horizontally loaded onto the pedestal 30 (Figs. 1-14 and 17-20). Specification, paragraph 0046, lines 7-12 and paragraph 0049, lines 20-22.

The method further includes moving the pedestal 30 (Figs. 1-14 and 17-20) to the raised position, the pedestal shield 50, 52, 54 (Figs. 1-4), 50a, 52a, 54a, 54b (Figs. 5 and 6), 50c, 52c (Figs. 7 and 8), 50d, 52d (Figs. 9 and 10), 50e, 52e (Figs. 11 and 12), 50f, 52f (Figs. 13 and 14), 50g, 52g (Figs. 15-18) and 50h, 52h (Figs. 19 and 20) and sidewall shield 40, 42, 44, 46 (Figs. 1-4), 40a, 42a, 42b (Figs. 5 and 6), 40c, 42c (Figs. 7 and 8), 40d, 42d (Figs. 9 and 10), 40e, 42e (Figs. 11 and 12), 40f, 42f (Figs. 13 and 14), 40g, 42g (Figs. 15-18) and 40h, 42h (Figs. 19 and 20) cooperating to prevent line-of-sight or gas-scattered transmission of deposition from the sputter target 26 (Figs. 2-20) to the side walls 34 (Figs. 1-20) and lower walls 36 (Figs. 2, 3 and 5-20) of the deposition chamber 20 (Figs. 1 and 2). Specification, paragraph 0047, lines 1-18.

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

The contested issues in this appeal are whether claims 1-11 and 13-20 are anticipated under 35 USC § 102 by Chung et al. U.S. Patent No. 6,171,453 or, in the alternative, are obvious under 35 USC § 103 from Chung et al.

ARGUMENT

I. Prior Art

The sole reference cited against the claims of the subject application, Chung et al. U.S. Patent No. 6,171,453, discloses a shielding system for a physical deposition chamber in which clamp ring 44 cooperates with lower chamber shield 48 (Figs. 3A and 3B), clamp ring 64 cooperates with lower chamber shield 68 (Figs. 5A and 5B) and pedestal shielding ring 84 cooperates with lower chamber shield 48 (Figs. 6A and 6B). However, the cooperation between these parts only takes place when the pedestal 42

or 82 is in the lowered or "release position." In the raised or "process position" described in Chung, the aforementioned parts are separated, and there is no cooperation. When Chung's pedestal is in the lowered position, Figs. 3A, 5A and 6A disclose that the lower ends of chamber shield 48 (Figs. 3A and 6A) and chamber shield 68 (Fig. 5A) are below the pedestal. The lower ends of Chung's chamber shield are also below the pedestal when the latter is in the raised position (Figs. 3B, 5B and 6B). In all instances, Chung's clamp rings 44 (Figs. 3A and 3B) and 64 (Figs. 5A and 5B) and shielding ring 84 (Figs. 6A and 6B) are above the lower end of chamber shields 48 (Figs. 3A and 6A) and chamber shield 68 (Fig. 5A).

II. The Examiner's Rejections and Appellants' Arguments as to Non-Obviousness

A. Claims 1, 14 and 20

Applicants' invention is a shielding system and method of shielding a physical vapor deposition chamber, which includes the pedestal shield and sidewall shield as recited in the claims, which cooperate, when the pedestal is in the raised position, to prevent line-of-sight deposition transmission from the sputter target to the side and lower walls of the deposition chamber. Importantly, in the claimed system and method, the pedestal is movable between a lowered loading and unloading position and a raised deposition processing position and surrounded by chamber interior lower, side and upper 32 (Figs. 2, 3, 5-8, and 11-20) walls. As stated in independent system claims 1 and 14, and in the second step of method claim 20, when the pedestal is in the lowered position (i.e., for loading), the claimed sidewall shield lower end is above the pedestal a distance sufficient to permit a wafer to be horizontally loaded onto the pedestal. This is an essential limitation needed for a prima facie rejection.

The Examiner has taken the position that the Chung et al. patent discloses a shielding system for a physical deposition chamber in which clamp ring 44 cooperates with lower chamber shield 48 (Figs. 3A and 3B), clamp ring 64 cooperates with lower chamber shield 68 (Figs. 5A and 5B) and pedestal shielding ring 84 cooperates with lower chamber shield 48 (Figs. 6A and 6B). See Final Office Action, p.2. In Chung, the cooperation between these parts only takes place when the pedestal 42 or 82 is in the lowered or "release position" as shown in Figs. 3A, 5A and 6A.

When Chung's pedestal is in the lowered position, the Chung reference fails to meet the structural and functional limitations of applicants' claimed invention with respect to the position of the sidewall shield lower end that is above the pedestal. Applicants' claims require that the position of the sidewall shield lower end be above the pedestal, when the pedestal is in the lowered position, a distance sufficient to permit a wafer to be horizontally loaded onto the pedestal. Chung's Figs. 3A, 5A and 6A clearly show the lower ends of chamber shield 48 (Figs. 3A and 6A) and chamber shield 68 (Fig. 5A) to be below the pedestal when it is in the lowered position. Thus, Chung lacks the essential limitation of claims 1, 14 and 20 that the lower ends of chamber shield 48 or 68 be above the pedestal when it is in the lowered position.

The Examiner has also taken the position that it would be inherent or obvious in Chung's design to remove part 48 (the lower chamber shield in Figs. 3A and 3B) via the connector pin to leave sufficient distance to load the wafer horizontally. See Final Office Action, p.3. This is irrelevant to meeting applicants' claimed limitation, and is itself an admission that Chung's shield 48 does not have a lower end that is above the pedestal, when the pedestal is in the lowered position, a distance sufficient to permit a wafer to be horizontally loaded onto the pedestal. If Chung's chamber shield 48 had a

lower end that was above the pedestal when the pedestal is in the lowered position, it would not have to be removed for horizontal loading of the wafer.¹ Since this limitation is in all the independent claims, applicants' claimed invention is not anticipated or rendered obvious by Chung.

Although not raised by the Examiner, applicants also wish to point out that Chung's upper chamber shield 46 also does not meet the limitations of the "sidewall shield" of claims 1, 14 and 20. As stated in those claims, the pedestal shield and sidewall shield cooperate, when the pedestal is in the raised position, to prevent line-of-sight deposition transmission from the sputter target to the side and lower walls of the deposition chamber. When in the raised position (Figs. 3B, 5B and 6B), there is clearly line of sight transmission between the pedestal and upper chamber shield 46 to the side and lower walls of the deposition chamber.

Accordingly, Chung does not anticipate or render obvious appellants' invention as recited in claims 1, 14 and 20.

B. Claims 6, 7, 17 and 18

Appellants' claims 6, 7, 17 and 18 are dependent on claims 1 and 14. These claims recite that the pedestal shield has an upper portion surrounding the pedestal, a lower portion extending downward therefrom around the pedestal toward the chamber lower wall and an outward portion extending upward and away from the lower portion. An example is disclosed in appellants' Fig. 4 showing pedestal shield upper

¹ On the other hand, if the chamber shield 48 is removed, it no longer is in the deposition chamber and therefore has no end above the pedestal.

portion 50 and arcuate portion 54 extending downward, outward and then upward, terminating in end 52. See specification, paragraph 0046, lines 2-5.

The Examiner has not cited any portion of Chung that discloses that the shielding ring an outward portion extending upward and away from the lower portion as in claims 6, 7, 17 and 18. See Final Office Action, p.4. The Chung patent discloses only that the clamp ring 64 (Figs. 5A and 5B) has a portion 74 extending horizontally outward. Chung discloses no outward portion extending upward and away from the lower portion of the pedestal shield. As such, appellants' claims 6, 7, 17 and 18 are novel and not obvious from Chung.

C. Claim 9

Claim 9, dependent on claim 1, recites that the pedestal shield extends outward from the pedestal toward the chamber sidewalls and below the sidewall shield lower end.

The Examiner has taken the position that Chung "depicts a sidewall shield (part 46) with a lower end disposed above the pedestal shield (part 84) when the pedestal is raised (figure 6B) and the pedestal shield extends outward from the pedestal (part 82) toward the chamber sidewalls and below the sidewall shield lower end." See Final Office Action, p.5. Here, the Examiner is attempting to limit the portion of Chung's disclosure that corresponds to the appellants' sidewall shield to part 46. However, the Examiner had previously stated that the portion of Chung's disclosure that corresponds to the appellants' sidewall shield also includes lower chamber shield 48. See, e.g., Final Office Action, p.3, lines 1-2 and 8-9. The Examiner cannot have it both ways.

Chung discloses that in all cases, whether the pedestal is in the raised or lowered position, the pedestal shield is above the lower end of chamber shield 48

(Figs. 3A and 6A) and chamber shield 68 (Fig. 5A). Since this is again the opposite of appellants' invention, claim 9 is not anticipated by or obvious from Chung.

D. Claim 11

Appellants' claim 11 is dependent on claim 1, and recites that the pedestal shield has an upper portion surrounding the pedestal and a lower portion extending downward therefrom around the pedestal toward the chamber lower wall, and that the shielding system further includes a bottom wall shield having a lower portion extending along the chamber lower wall, and inward and outward portions extending upward from the bottom wall shield lower portion. The bottom wall shield inward portion extends inward of the pedestal shield lower portion and the bottom wall shield outward portion extending outward of the pedestal shield lower portion. An example is shown in appellants' Figs. 15-18 showing pedestal shield lower portion 52g and bottom shield 60a, 60b, 60c. See specification, paragraph 0053, lines 6-19.

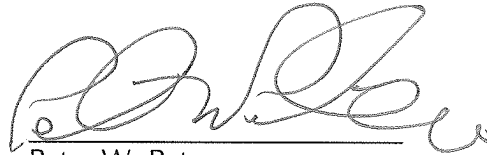
The Examiner takes the position that Chung discloses a "bottom wall shield (figure 6A, part 48)" that meets the limitations of appellants' claim 11. See Final Office Action, p. 5. Again, this particular feature (part 48) of Chung was previously cited as corresponding to appellants' sidewall shield. See, e.g., Final Office Action, p.3, lines 1-2 and 8-9. It cannot correspond to both appellants' sidewall shield and bottom wall shield. Moreover, Chung's part 48 does not extend along the chamber lower wall, as applicant specifies, and therefore doesn't meet the limitations of claim 11.

Since Chung discloses no bottom wall shield along the chamber lower wall having inward and outward portions extending upward therefrom, the Chung patent cannot anticipate or render obvious appellants' claim 11.

CONCLUSION

For the reasons given above, appellants submit that the claims of the instant application are not anticipated by/obvious from the cited prior art Chung patent. Reversal of the rejections under 35 USC §§ 102 and 103 is respectfully requested.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Peter W. Peterson', written over a horizontal line.

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CLAIMS APPENDIX**Rejected Claims of Serial No. 10/823,355**

1. (previously presented) A shielding system for a physical vapor deposition chamber, the chamber having a pedestal movable between a lowered loading and unloading position and a raised deposition processing position and surrounded by chamber interior lower, side and upper walls, the chamber further including a sputter target above the pedestal, the shielding system comprising:

- a pedestal shield attachable to the pedestal and movable therewith between the lowered and raised positions, the pedestal shield surrounding and extending outward from the pedestal toward the chamber side or lower walls; and

- a sidewall shield adapted to extend substantially around and within the chamber sidewalls, and downward from an upper portion thereof, the sidewall shield having a lower end extending inward and disposed adjacent the pedestal shield upper portion when the pedestal is in the raised position, the sidewall shield lower end being above the pedestal, when the pedestal is in the lowered position, a distance sufficient to permit a wafer to be horizontally loaded onto the pedestal,

the pedestal shield and sidewall shield cooperating, when the pedestal is in the raised position, to prevent line-of-sight deposition transmission from the sputter target to the side and lower walls of the deposition chamber.

2. (original) The shielding system of claim 1 wherein, when the pedestal is in the raised position, the pedestal shield and sidewall shield further cooperate to prevent line-of-sight or gas-scattered transmission deposition from sides of the pedestal shield facing toward the chamber upper walls to the side and lower walls of the deposition chamber.

3. (original) The shielding system of claim 1 wherein the sidewall shield lower end is disposed below and outward of an upper surface of the pedestal when the pedestal is in the raised position.

4. (original) The shielding system of claim 1 wherein the pedestal shield has an upper portion surrounding the pedestal and a lower portion extending downward therefrom around the pedestal toward the chamber lower wall.

5. (original) The shielding system of claim 1 wherein the pedestal shield has an upper portion surrounding the pedestal, a lower portion extending downward therefrom around the pedestal toward the chamber lower wall and an outward portion extending away from the lower portion, and the sidewall shield has a lower end disposed below and outward of the pedestal shield upper portion and inward of the pedestal shield outward portion when the pedestal is in the raised position.

6. (original) The shielding system of claim 1 wherein the pedestal shield has an upper portion surrounding the pedestal, a lower portion extending downward therefrom around the pedestal toward the chamber lower wall and an outward portion

extending upward and away from the lower portion, and the sidewall shield has a lower end disposed outward of the pedestal shield upper portion and inward of the pedestal shield outward portion when the pedestal is in the raised position, the sidewall shield further having an outward portion between the chamber sidewall and the sidewall shield lower end disposed outward of the pedestal shield outward portion when the pedestal is in the raised position.

7. (original) The shielding system of claim 1 wherein the pedestal shield has an upper portion surrounding the pedestal, a lower portion extending downward therefrom around the pedestal toward the chamber lower wall and an outward portion extending upward and away from the lower portion, and the sidewall shield has a lower end disposed below and outward of the pedestal shield upper portion and inward of the pedestal shield outward portion when the pedestal is in the raised position.

8. (original) The shielding system of claim 6 wherein the sidewall shield has an outward portion between the chamber sidewall and the sidewall shield lower end disposed outward of the pedestal shield outward portion when the pedestal is in the raised position.

9. (original) The shielding system of claim 1 wherein the sidewall shield lower end is disposed above the pedestal shield when the pedestal is in the raised position and the pedestal shield extends outward from the pedestal toward the chamber sidewalls and below the sidewall shield lower end.

10. (original) The shielding system of claim 1 wherein the pedestal shield has an upper portion surrounding the pedestal and a lower portion extending downward therefrom around the pedestal toward the chamber lower wall, and the sidewall shield has an extension to the lower end thereof extending downward below the pedestal shield lower portion, and an inward portion extending upward from the extension, and wherein the pedestal shield lower portion is between the sidewall shield lower end extension and sidewall shield inward portion.

11. (previously presented) The shielding system of claim 1 wherein the pedestal shield has an upper portion surrounding the pedestal and a lower portion extending downward therefrom around the pedestal toward the chamber lower wall, and further including a bottom wall shield having a lower portion extending along the chamber lower wall, and inward and outward portions extending upward from the bottom wall shield lower portion, the bottom wall shield inward portion extending inward of the pedestal shield lower portion and the bottom wall shield outward portion extending outward of the pedestal shield lower portion.

12. (cancelled)

13. (original) The shielding system of claim 1 wherein the pedestal and sidewall shields are adapted to avoid contact with each other in the raised and lowered pedestal positions.

14. (previously presented) A shielding system for a physical vapor deposition chamber, the chamber having a pedestal movable between a lowered loading and unloading position and a raised deposition processing position and surrounded by chamber interior lower, side and upper walls, the chamber further including a sputter target above the pedestal, the shielding system comprising:

- a pedestal shield securable to the pedestal and movable therewith, the pedestal shield having an upper portion surrounding the pedestal and a lower portion extending downward therefrom around the pedestal toward the chamber lower wall; and

- a sidewall shield adapted to extend downward from an upper portion of the chamber sidewalls and having a lower end disposed below the pedestal shield upper portion when the pedestal is in the raised position, the sidewall shield lower end being above the pedestal, when the pedestal is in the lowered position, a distance sufficient to permit a wafer to be horizontally loaded onto the pedestal,

the pedestal shield and sidewall shield cooperating, when the pedestal is in the raised position, to prevent line-of-sight deposition transmission from the sputter target to the side and lower walls of the deposition chamber, and line-of-sight or gas-scattered transmission of deposition from sides of the pedestal shield facing toward the chamber upper walls to the side and lower walls of the deposition chamber.

15. (original) The shielding system of claim 14 wherein the pedestal shield has an upper portion surrounding the pedestal and a lower portion extending downward therefrom around the pedestal toward the chamber lower wall.

16. (original) The shielding system of claim 14 wherein the pedestal shield has an upper portion surrounding the pedestal, a lower portion extending downward therefrom around the pedestal toward the chamber lower wall and an outward portion extending away from the lower portion, and the sidewall shield has a lower end disposed below and outward of the pedestal shield upper portion and inward of the pedestal shield outward portion when the pedestal is in the raised position.

17. (original) The shielding system of claim 14 wherein the pedestal shield has an upper portion surrounding the pedestal, a lower portion extending downward therefrom around the pedestal toward the chamber lower wall and an outward portion extending upward and away from the lower portion, and the sidewall shield has a lower end disposed outward of the pedestal shield upper portion and inward of the pedestal shield outward portion when the pedestal is in the raised position, the sidewall shield further having an outward portion between the chamber sidewall and the sidewall shield lower end disposed outward of the pedestal shield outward portion when the pedestal is in the raised position.

18. (original) The shielding system of claim 14 wherein the pedestal shield has an upper portion surrounding the pedestal, a lower portion extending downward therefrom around the pedestal toward the chamber lower wall and an outward portion

extending upward and away from the lower portion, and the sidewall shield has a lower end disposed below and outward of the pedestal shield upper portion and inward of the pedestal shield outward portion when the pedestal is in the raised position.

19. (original) The shielding system of claim 17 wherein the sidewall shield has an outward portion between the chamber sidewall and the sidewall shield lower end disposed outward of the pedestal shield outward portion when the pedestal is in the raised position.

20. (original) A method of shielding a physical vapor deposition chamber, the chamber having a pedestal movable between a lowered loading and unloading position and a raised deposition processing position and surrounded by chamber interior lower, side and upper walls, the chamber further including a sputter target above the pedestal, the method comprising:

providing a shielding system having a pedestal shield secured to the pedestal and movable therewith between the lowered and raised positions, the pedestal shield surrounding and extending outward from the pedestal toward the chamber side or lower walls, and a sidewall shield extending substantially around and within the chamber sidewalls, and downward from an upper portion thereof, the sidewall shield having a lower end extending inward and disposed adjacent the pedestal shield upper portion when the pedestal is in the raised position;

moving the pedestal to the lowered position in the chamber such that the sidewall shield lower end is above the pedestal a distance sufficient to permit a wafer to be horizontally loaded onto the pedestal; and moving the pedestal to the raised position, the pedestal shield and sidewall shield cooperating to prevent line-of-sight or gas-scattered transmission of deposition from the sputter target to the side and lower walls of the deposition chamber.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None